Universal Power Modules, Vertical Receptacles, and Right–Angle Headers

NOTE

All numerical values are in metric units. Dimensions are in millimeters. Unless otherwise specified, dimensions have a tolerance of ±0.13 mm and angles have a tolerance of ±2°. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for the application of AMP* Universal Power Modules, Vertical Receptacles, and Right–Angle Headers. The connectors have blade to blade centerline spacing of 3.0 mm.

Universal Power Modules consist of a vertical receptacle and a right–angle header. Both are available with ACTION PIN* Contacts. These contacts are designed with a press fit and eliminate the need for soldering. These connectors are configured for use with the AMP Z–PACK* 2 mm Product Family and use identical ACTION PIN contacts. They can also be used with other AMP motherboard/daughterboard connectors such as AMP Z–PACK 2 mm FB, HDI, Eurocard, Stripline 100, TBC, AND TBC+. Contact the Product Information number at the bottom of this page for other product lines that may mate with Universal Power Modules.

When corresponding with AMP personnel, use the terminology provided on this specification to help facilitate your inquiry for information. Basic terms and features of components are provided in Figure 1.

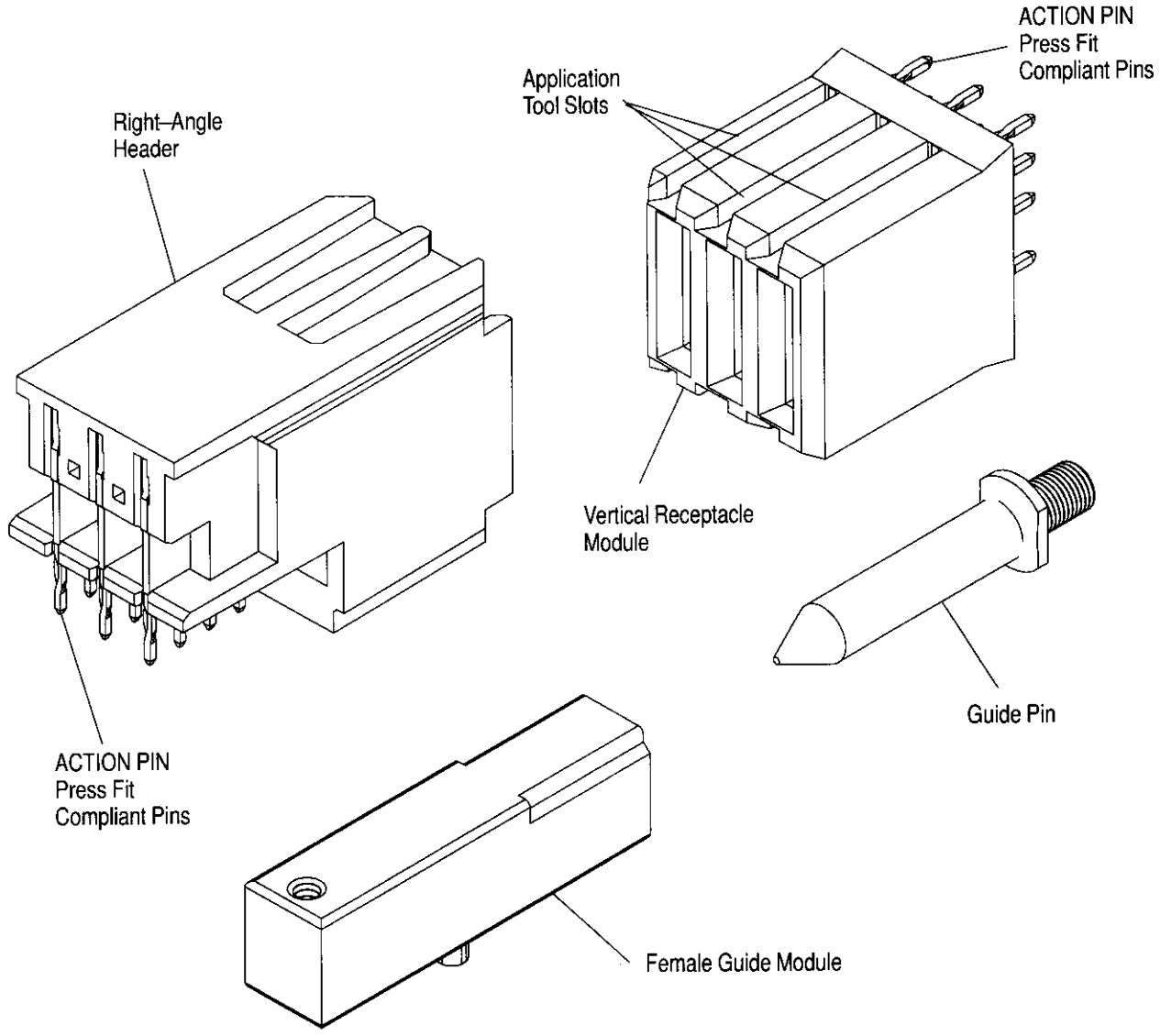

Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

This paragraph is reserved for a revision summary of changes and additions made to this specification. No summary is required on this initial release (Rev O).

2.2. Customer Assistance

Reference Part Number 223961 and Product Code 2989 are representative numbers of AMP Universal Power Modules, Vertical Receptacles, and Right–Angle Headers. Use of these numbers will identify the product line and expedite your inquiries through an AMP service network established to help you obtain product and tooling information. Such information can be obtained through a local AMP Representative (Field Sales Engineer, Field Applications Engineer, etc) or, after purchase, by calling the Tooling Assistance Center or the AMP FAX/Product Information Center number at the bottom of page 1.

2.3. Drawings

AMP Customer Drawings for specific products are available from the service network. The information contained in Customer Drawings takes priority if there is a conflict with this specification or with any technical documentation supplied by AMP Incorporated.

2.4. Bulletins

AMP Corporate Bulletin 401–52 is available from the service network. This bulletin provides information on various flux types and characteristics along with the commercial designation and flux removal procedures. A checklist is attached to the bulletin as a guide for information on soldering problems.

2.5. Instructional Material

The following list includes available AMP instruction sheets (408–series) that provide assembly procedures for product, operation, maintenance and repair of tooling; and customer manuals (409–series) that provide setup, operation, and maintenance of AMP machines.

Document Number	Document Title
408–4169	AMP Seating Tool 224421–1 for Universal Power Module Receptacles with ACTION Pin Contacts
408–6923	AMP Manual Arbor Frame Assembly 58024–1
408–6927	AMP Design Recommendations for Printed Circuit Board Support Fixture
408–7777	AMP Manual Arbor Frame Assembly 91085–2
409–5567	AMP 10/20–Ton "H" Frame Power Unit Machine No. 803880–6
409–5626	AMP SM–3 Machine No. 814700–[ ]

3. REQUIREMENTS

3.1. Storage

A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the connector housings.

B. Shelf Life

The connectors should remain in the anti–static shipping tubes until ready for use to prevent deformation to the connectors. The connectors should be stored at normal room temperatures with low humidity, and used on a first in, first out basis to avoid storage contamination that could adversely affect signal transmissions.

C. Chemical Exposure

Do not store connectors near any chemicals listed below as they may cause stress corrosion cracking in the contacts.

Alkalies	Ammonia	Citrates	Phosphates Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites	Tartrates

3.2. Connector Features

A. Materials

All AMP Universal Power Module housings are made of high–temperature thermoplastic. The contacts are phosphor bronze and plated at the contact surface with gold over nickel. The ACTION PIN Contact area is tin–lead over nickel.

B. Size

These connectors are available only in a three position size.

C. Sequencing Options

Three different levels of sequencing are available. It is recommended that Level 3 be used in conjunction with either a rack system or a guide pin/guide receptacle arrangement. See Figure 2.

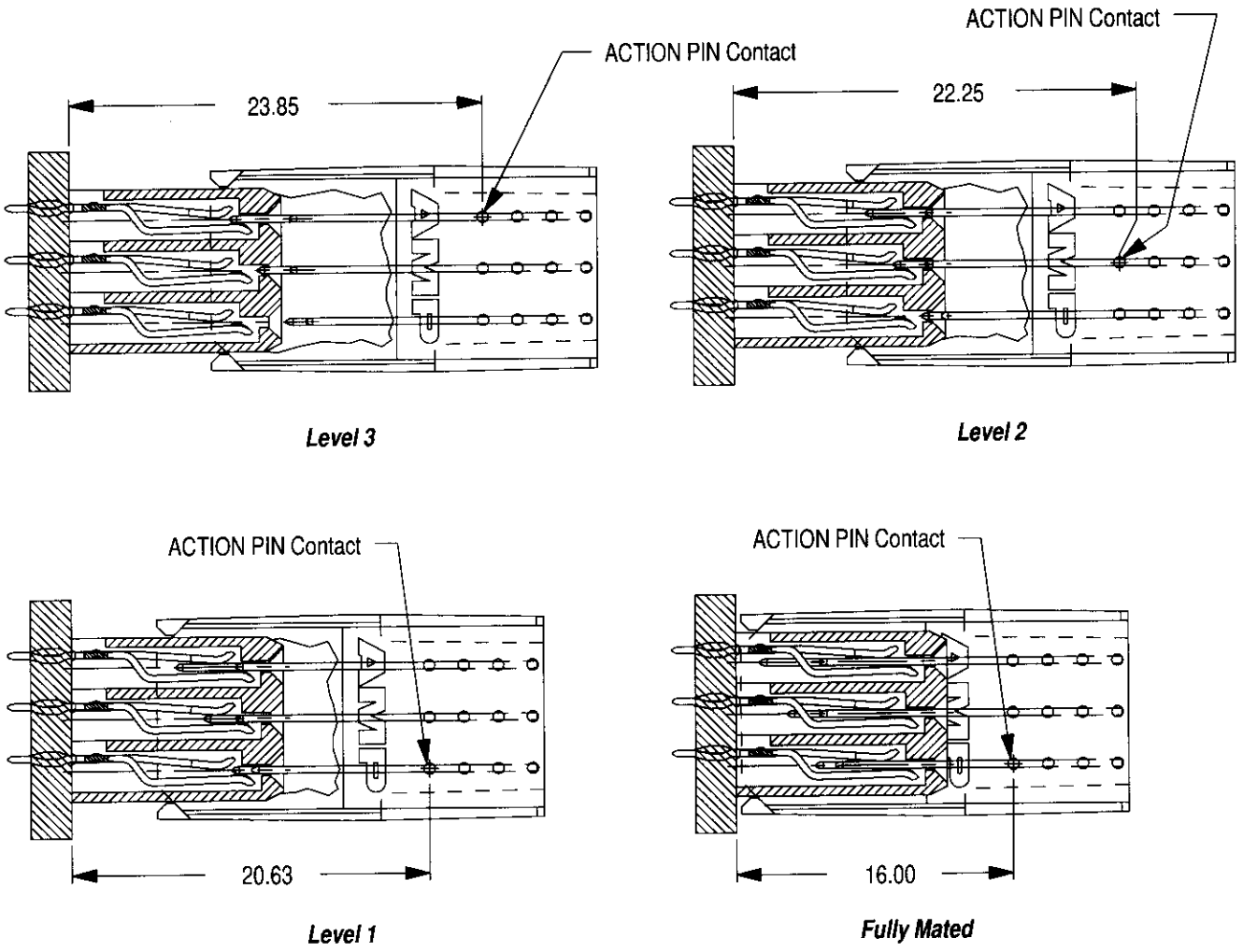

Figure 2

D. End–to–End Placement

The ends of the right–angle housing are 3.0 mm maximum from the first and third right–angle blade centerlines. This allows the pattern of holes for these blades to be 4.0 mm from the hole pattern of an AMP Z–PACK HM Connector. For power modules placed side–by–side, a 12.0 mm centerline spacing can be used. See Figure 3.

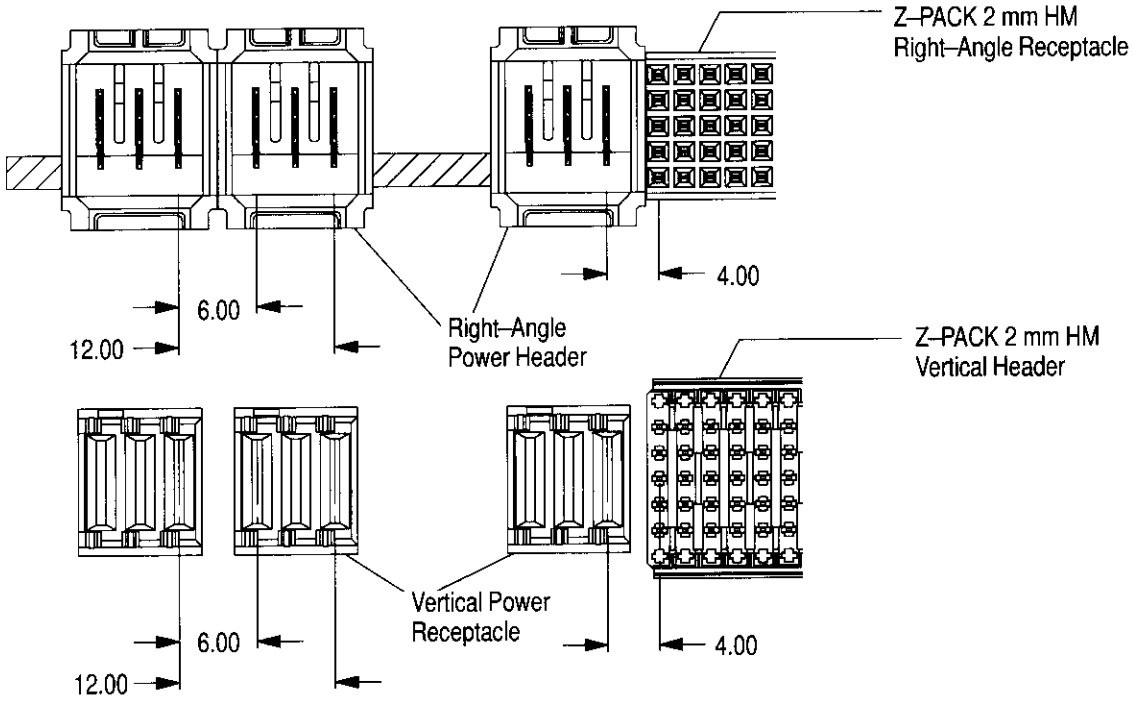

Figure 3

E. Cleaning

Connector housings are chemically resistant to most standard cleaning fluids used in the electronics industry. The following cleaners are compatible with the connector when applied for the times and temperatures listed. Call the AMP FAX/Product Information number listed at the bottom of page 1 to verify the use of any cleaner not listed in Figure 4.

DANGER *To avoid personal injury, strict attention must be given to the recommendations of the solvent manufacturer regarding toxicity and other safety requirements. Request the Material Safety Data Sheet (MSDS) from the supplier.*

CLEANER		TIME (Minutes)	TEMPERATURES (Maximum)	
NAME	TYPE		CELSIUS	FAHRENHEIT
Alpha 2110■	Aqueous	1	132	270
Bioact EC–7◆	Solvent	5	100	212
Carbitol●	Solvent	1	Room Ambience	
Isopropyl Alcohol	Solvent	5	100	212
Kester 5778⁂	Aqueous	5	100	212
Kester 5779⁂	Aqueous	5	100	212
Lonco 520●	Aqueous	5	100	212
Lonco 530●	Aqueous	5	100	212
Terpene Solvent	Solvent	5	100	212

■ Product of Fry's Metals, Inc. ◆ Product of Petroferm, Inc. ● Product of Union Carbide Corp. ⁂ Product of Litton Systems, Inc.

Figure 4

F. Drying

When drying cleaned assemblies and pc boards, do not exceed the temperature limitations of –55° to 125°C. Excessive temperatures may cause housing degradation.

3.3. Alignment

Proper alignment is essential to ensure full engagement of mating connectors and also to ensure the contacts are not bent or otherwise damaged during mating and unmating. For alignment tolerances, see Figure 5.

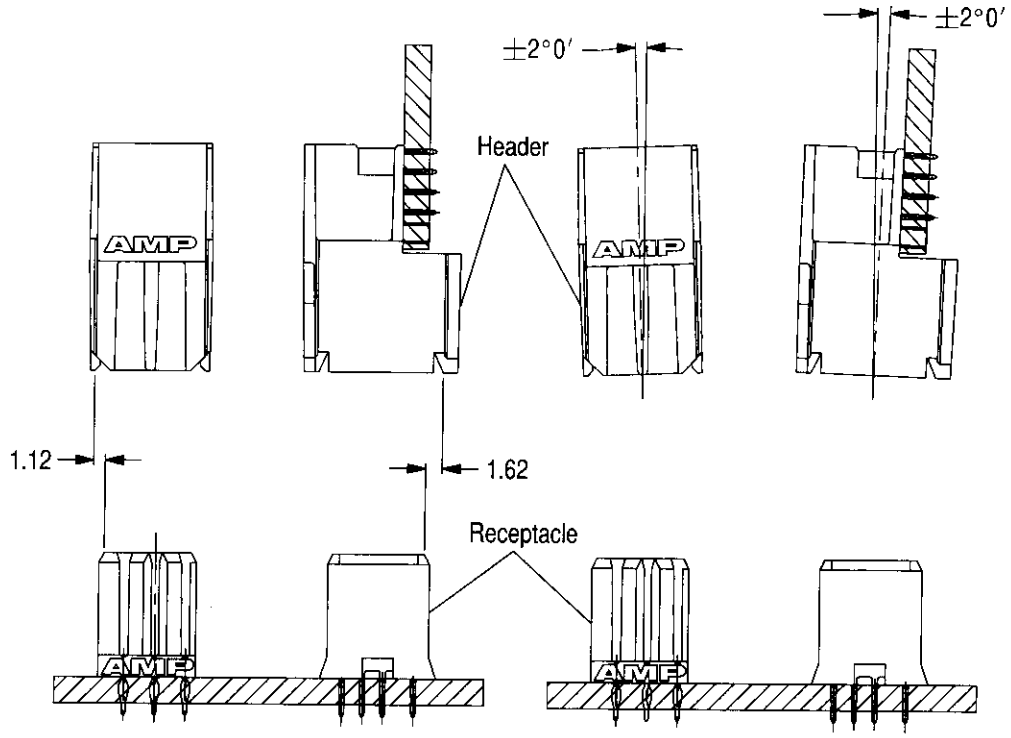

Figure 5

3.4. Guide Pin and Guide Module

The guide pin and female guide module are designed to help in connector alignment. Interaction of these two pieces of hardware provide error–free mating and prevents mating damage to the connector housings and contacts. See Figure 6.

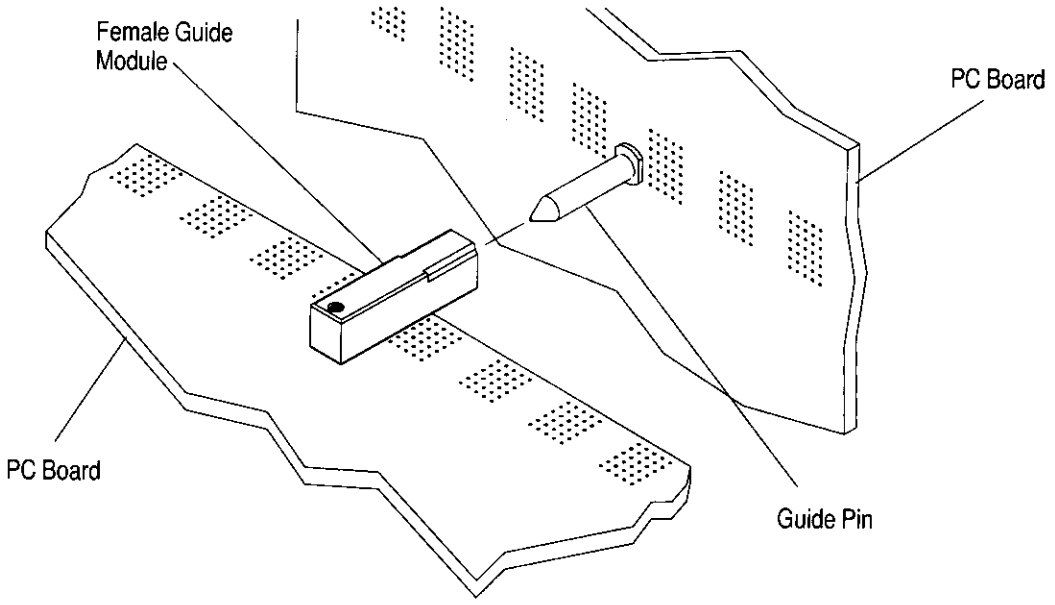

Figure 6

3.5. Mating Dimensions

Full mating of the connectors is necessary to ensure a good connection. The dimension from the surface of the pc board to which the vertical receptacle is mounted to the first row of contacts in the right–angle header should be as shown in Figure 7.

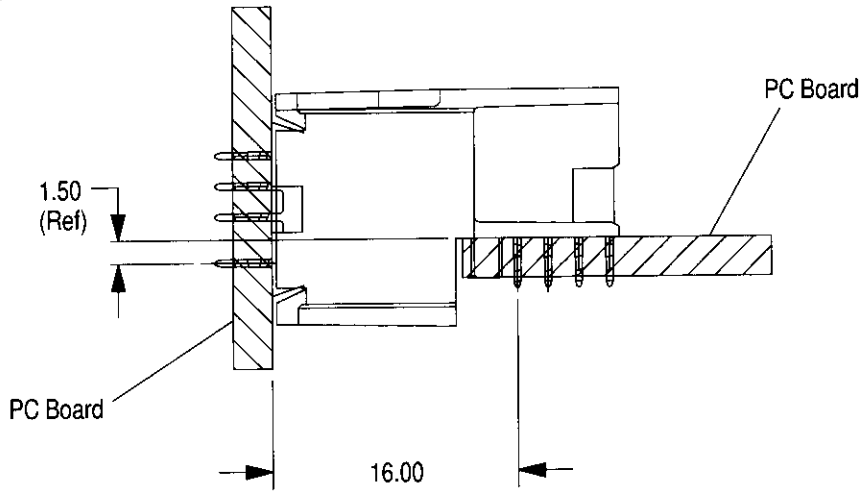

Figure 7

3.6. PC Board Requirements

A. PC Board Thickness

The right–angle pin header connectors with compliant pins require a pc board with a minimum thickness of 1.4 mm. The vertical receptacle connectors with compliant pin contacts require a pc board with a minimum thickness of 2.13 mm.

B. PC Board Circuit Pattern Layout

The pc board layout patterns for the placement of AMP Universal Power Modules are provided in Figure 8.

The vertical receptacle ACTION PIN contact tines are arranged in such a way that the connector can only be placed on the pc board in one orientation. This is because the tines are not symmetrical about the centerline of the housing.

NOTE *For applications requiring the minimum installation force for the connector, the pc board through–hole size should be in the high end of the allowable tolerance.*

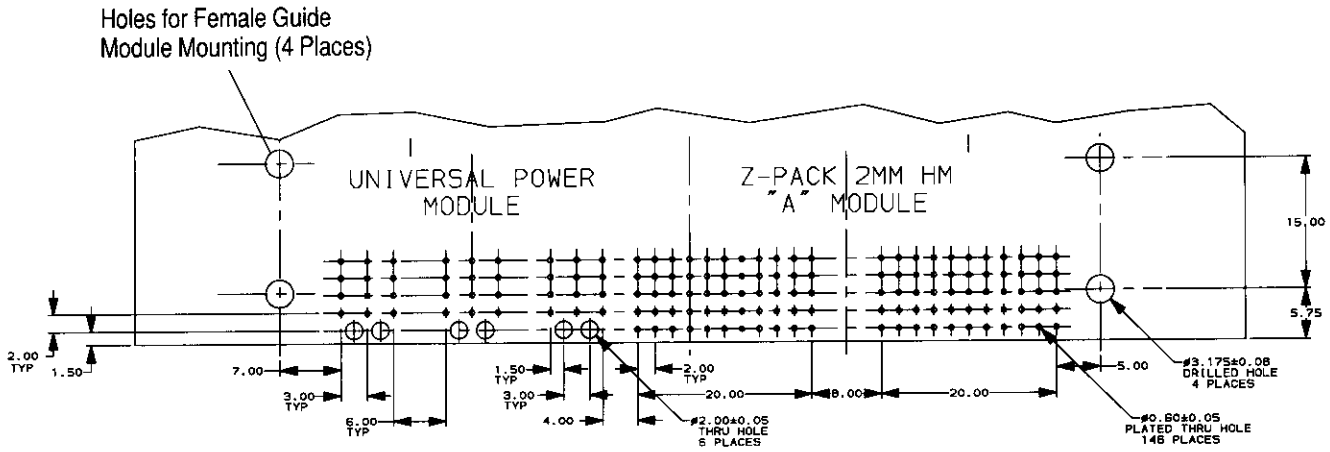

Figure 8 (cont'd)

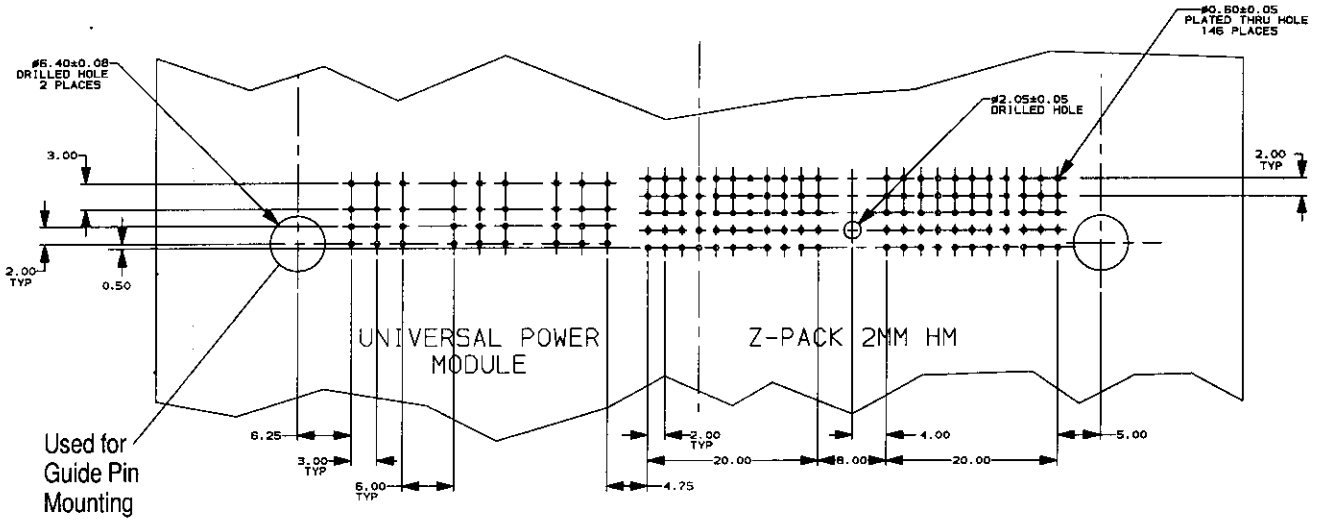

Figure 8 (end)

C. Contact Hole Configuration

The contact holes in the pc board for all connectors must be prepared to the dimensions specified in Figure 9.

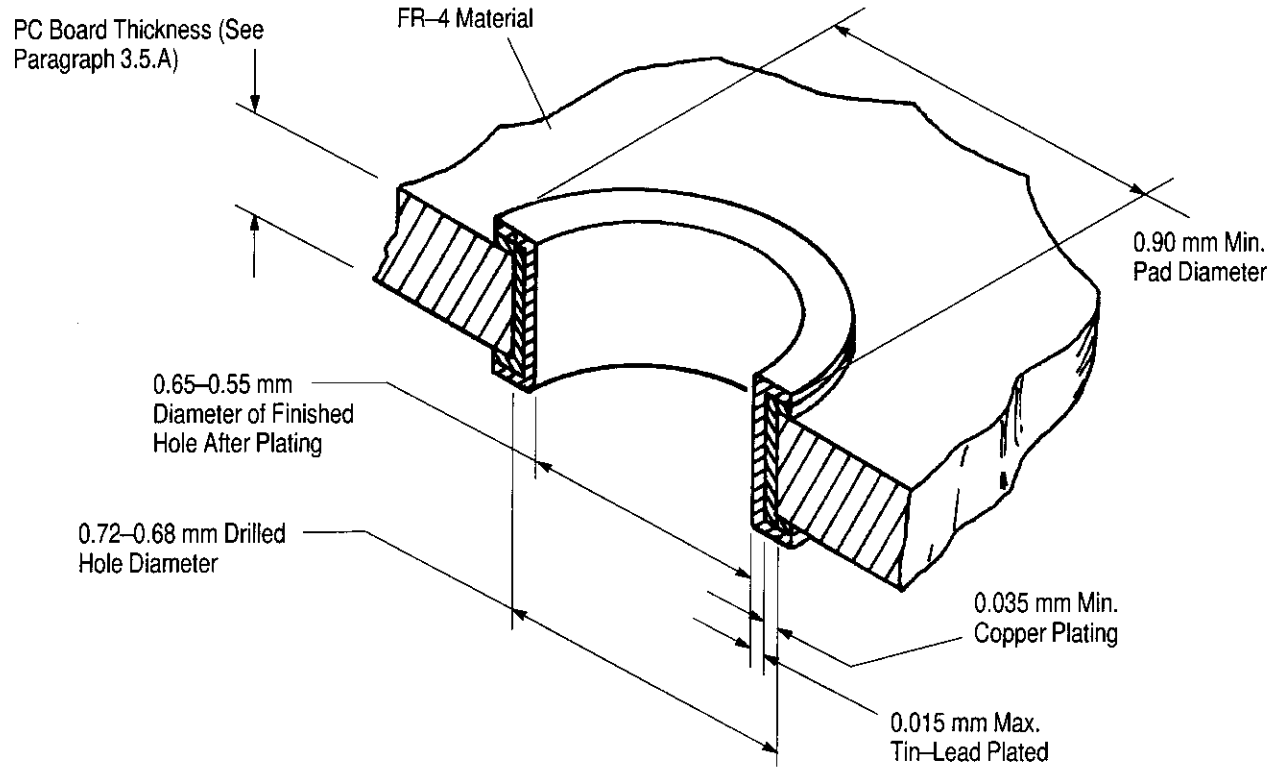

Figure 9

3.7. Special Handling

A. Initial Positioning

AMP Universal Power Modules, Vertical Receptacles, and Right–Angle Headers may be applied to a pc board either by hand or by robotic equipment. See Section 5, TOOLING.

Connectors should be gripped by the housing only and not by the contacts. When placing a connector into a pc board, all contact tines should be aligned and inserted into the pc board simultaneously to prevent twisting or bending of the contacts. If using robotic equipment, a total equipment accuracy of ±0.13 mm, including the gripper and fixture tolerance and equipment repeatability, is required.

B. Seating Connectors

Seating force must be applied evenly on the connectors to prevent deformation or other damage to the contacts and housings. When installing receptacle connectors, the insertion force must be simultaneously applied to the shoulders of each contact at the bottom of the slots on the exterior or the housing. When installing right–angle header connectors, the insertion force must be evenly applied to the back/top surface of the connector housing. Each connector requires up to 1067 N of force to apply. Tooling recommendations are covered in Section 5.

3.8. Repair

Damaged contacts cannot be removed from modules. The entire module will have to be removed from the pc board and replaced with a new one.

A. Right–Angle Header Connectors

Place the daughterboard on a fixture that provides support all around the housing to be removed. Make sure the fixture will not interfere with or damage any other components on the pc board. Apply an even force to all contact pins with a push bar and press capable of applying 800 N. See Figure 10.

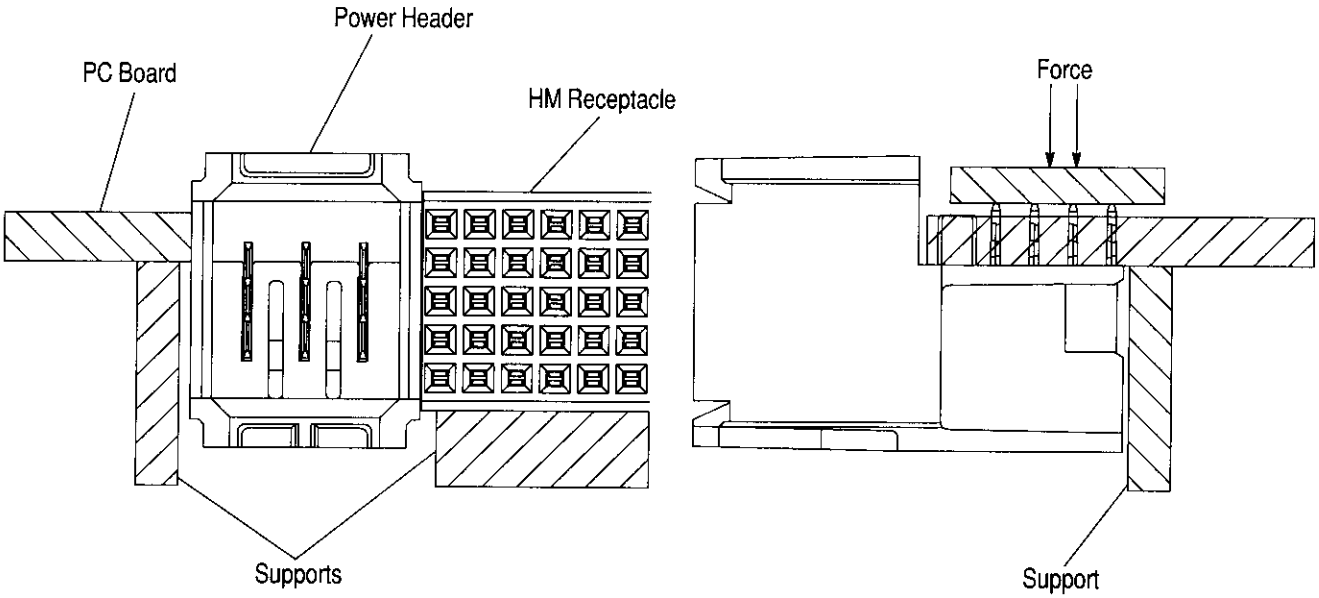

Figure 10

B. Vertical Receptacle Connectors

Place the motherboard/backplane on a fixture that provides support all around the housing to be removed. Make sure the fixture will not interfere with or damage any other components on the pc board. Apply an even force to all contact pins with a pushbar and press capable of applying 800 N. See Figure 11.

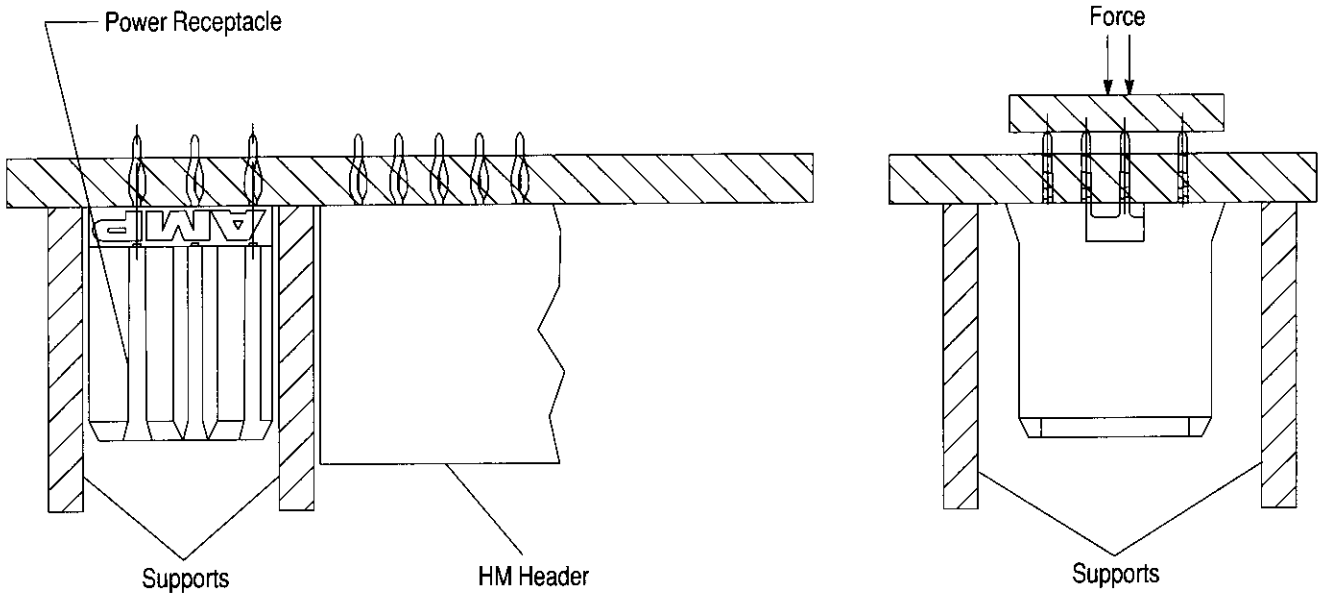

Figure 11

4. QUALIFICATION

These connectors are approved for Bellcore TR–NTW–001217 and International Electrotechnical Commission (IEC) 1076–4 testing. They have been tested and component recognized by Underwriters' Laboratories, Inc., and are component recognized by the Canadian Standards Association, under File E–28476.

5. TOOLING

AMP has existing tooling and tooling concepts for applying these connectors. Part numbers of available tools and the applicable instructional material for each is provided in Figure 12.

5.1. Robotic Equipment

Robotic equipment for placement of connectors on a pc board must have a true position accuracy of 0.13 mm to ensure proper location and insertion of the contact pins. This includes gripper and fixture tolerances as well as equipment repeatability. It must use the connector datum surface to ensure reliable connector placement. AMP Tooling Engineers have designed machines for a variety of application requirements. If you need assistance in setting up prototype or production line equipment, contact AMP Tooling Engineering through your local AMP Representative or call the AMP Tooling Assistance Center number at the bottom of page 1.

5.2. Seating Tool

AMP seating tools are designed to push evenly on the shoulders of the vertical receptacle contact (see Figure 1) and force the compliant pins into the pc board.

5.3. Push Bar

Commercially available bar stock with a flat surface large enough to cover the top surface of right–angle connectors and capable of transmitting 7.9 N per pin can be used as a push bar to insert the compliant pin contacts in the pc board. The same type tooling can be used to remove damaged right–angle connectors from a pc board by pressing evenly on the compliant end of the contacts.

5.4. PC Board Support

A pc board support must be used to prevent bowing of the pc board during insertion of the compliant pin connectors. It should have a flat surface with holes or a channel large enough to receive the pins during installation.

5.5. Housing Support

A housing support with sides and ends as close as possible to the receptacle housing is recommended for removing damaged receptacle connectors from pc boards.

CONNECTOR	SEATING TOOL (DOCUMENT)	MACHINE (DOCUMENT)
VERTICAL RECEPTACLE UPPER TOOL	224421–1 (408–4169)	803880–6 (409–5567) 814700–2 (409–5626) 91085–2 (408–7777)
VERTICAL RECEPTACLE BOARD SUPPORT	217602–1 (N/A)	
RIGHT–ANGLE HEADER UPPER TOOL	224441–1 (N/A)	
RIGHT–ANGLE HEADER BOARD SUPPORT	224442–1 (N/A)	
FEMALE GUIDE MODULE UPPER TOOL	224440–1 (N/A)	
FEMALE GUIDE MODULE BOARD SUPPORT	217603–1 (N/A)	

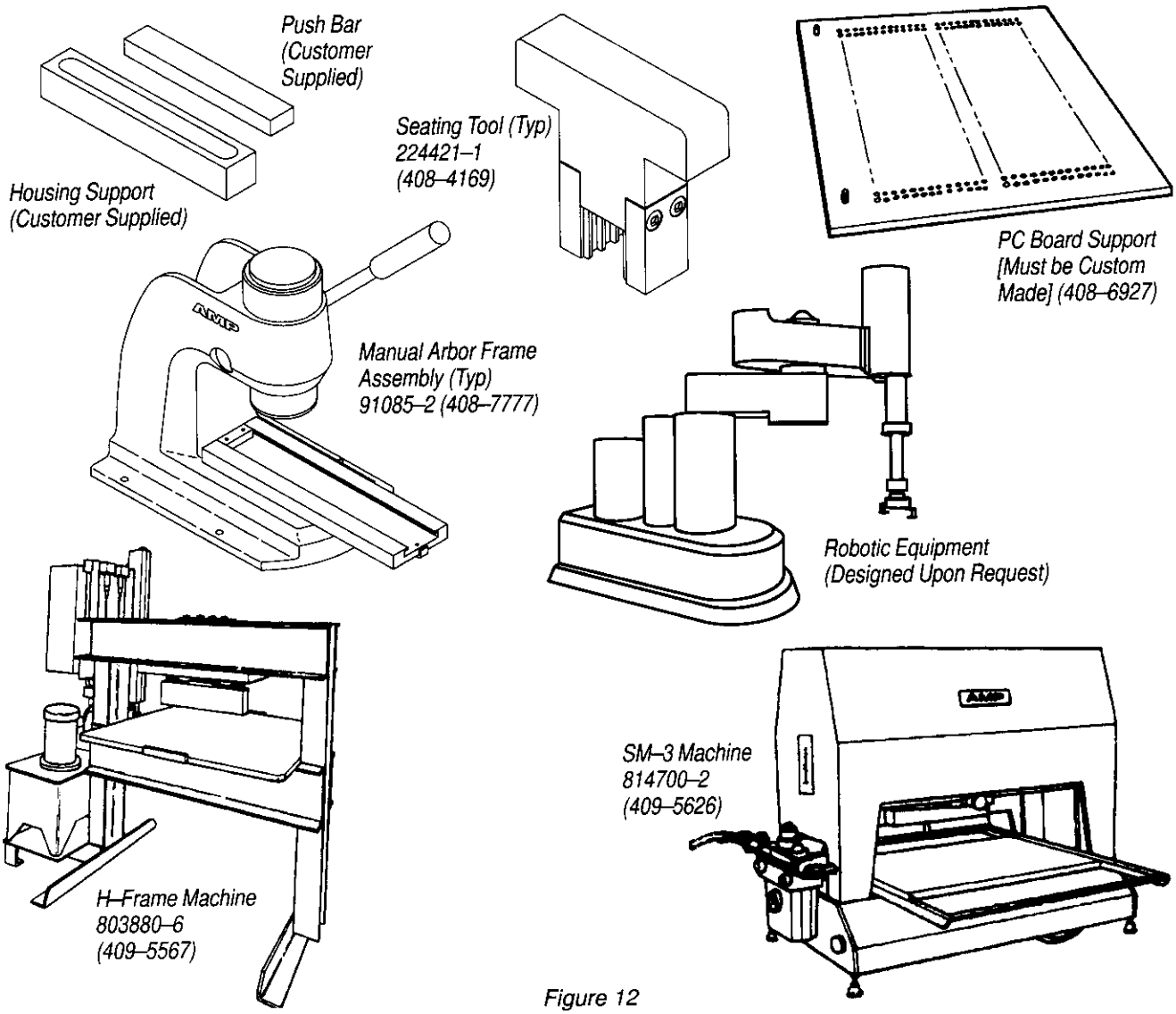

Figure 12

6. VISUAL AID

Figure 13 shows a typical application of AMP Universal Power Modules, Vertical Receptacles, and Right–Angle Headers. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.

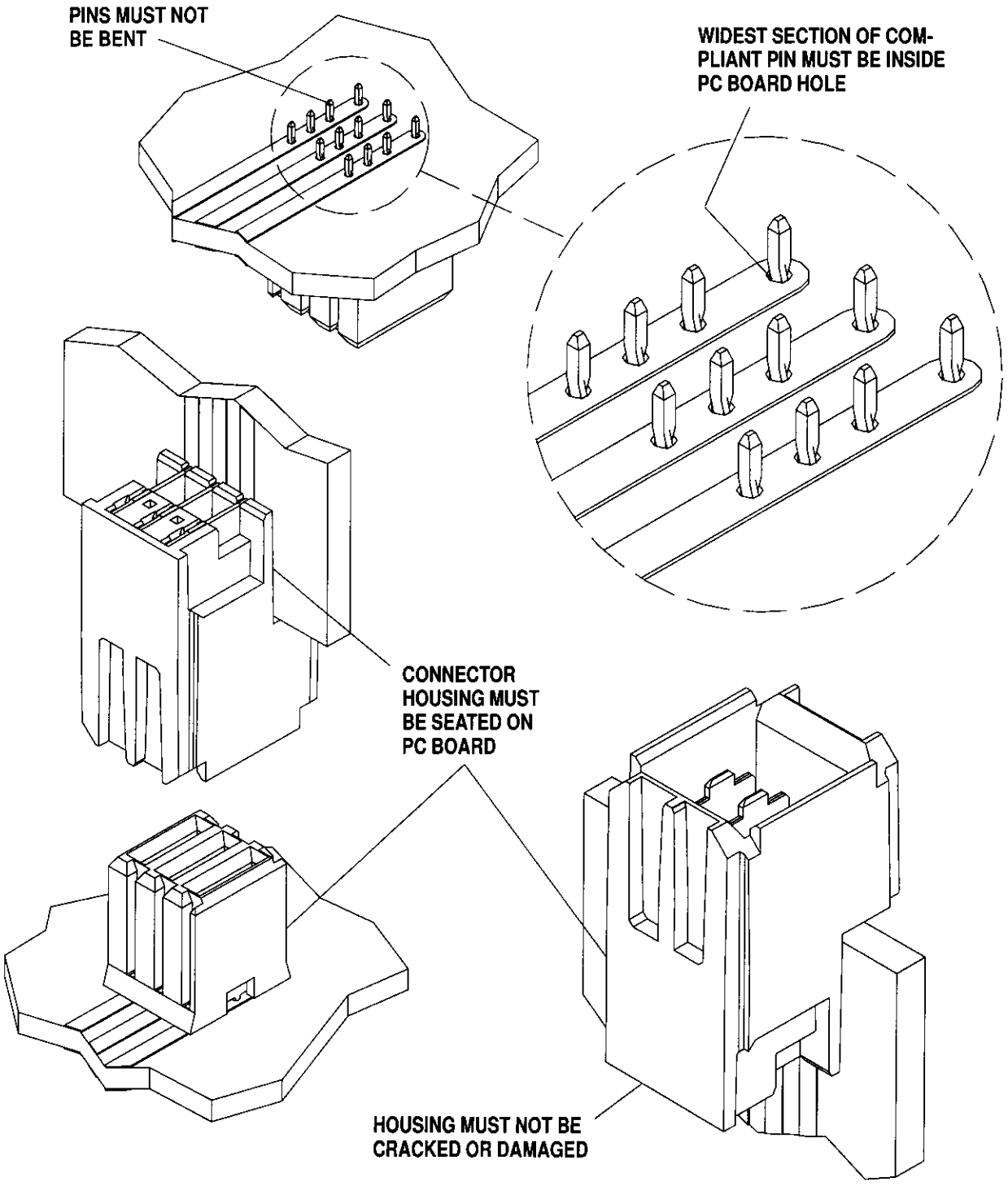

FIGURE 13. VISUAL AID